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USPT	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	57	<u>L1</u>

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USPT	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	57	<a href="#">L1</a>

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EPAB	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	4	<u>L3</u>
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USPT	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	57	<u>L1</u>

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TDBD	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	1	<u>L4</u>
EPAB	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	4	<u>L3</u>
JPAB	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	2	<u>L2</u>
USPT	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	57	<u>L1</u>

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USPT	(710/100)!.CCLS. or 710/101.ccls. or 710/8.ccls. or 710/72.ccls. or 712/11.ccls. or 712/14.ccls. or 712/18.ccls. or 716/17.ccls. or 716/16.ccls. or 326/38.ccls. or 326/39.ccls. or 326/41.ccls.	3233	<u>L5</u>
TDBD	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	1	<u>L4</u>
EPAB	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	4	<u>L3</u>
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USPT	(bus\$3 or (sub adj1 bus\$3)) same (bundle\$1 or group\$1 or together or package\$1) same ((data adj1 flow adj1 processor\$1) or (programmable adj1 gate adj1 array\$1))	57	<u>L1</u>



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**1 Exploiting inter task dependencies for dynamic load balancing**

*Becker, W.; Waldmann, G.*

High Performance Distributed Computing, 1994., Proceedings of the Third IEEE International Sym 1994

Page(s): 157 -165

[\[Abstract\]](#) [\[PDF Full-Text\]](#) **CNF**

**2 Scan line graphics generation on the massively parallel processor**

*Dorband, J.E.*

Frontiers of Massively Parallel Computation, 1988. Proceedings., 2nd Symposium on the Frontiers


Page(s): 327 -329

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## Exploiting inter task dependencies for dynamic load balancing

- Becker, W.; Waldmann, G.

Inst. for Parallel & Distributed High Performance Syst., Stuttgart Univ., Germany

*This paper appears in: High Performance Distributed Computing, 1994., Proceedings of the Th International Symposium on*

On page(s): 157 - 165

2-5 Aug. 1994

1994

ISBN: 0-8186-6395-2

IEEE Catalog Number: 94TH0667-6

Number of Pages: xiii+304

References Cited: 21

INSPEC Accession Number: 4778644

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### Abstract:

The major goal of dynamic load balancing is not primarily to equalize the load on the nodes of a parallel system, but to optimize the average response time of single requests or the throughput of all application system. Therefore it is often necessary not only to keep all processors busy and all processor ready queue within the same range, but to avoid delays and inefficient computations caused by foreseeable but ignored and precedence constraints between related tasks. We present concepts for dynamic consideration of inter task dependencies within small groups of tasks and evaluate them observing real applications in a load balanced environment on a network of workstations. The concepts are developed from scheduling of single task towards heterogeneous multi user operation scenarios.

---

### Index Terms:


resource allocation; scheduling; optimisation; computer networks; workstations; inter task dependencies; load balancing; parallel computing system; response time; optimization; processor ready queue length; inefficient computation; data flow; workstation network; scheduling; single task graphs; heterogeneous operation scenarios

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## Scan line graphics generation on the massively parallel processor

- Dorband, J.E.  
NASA, Greenbelt, MD, USA

*This paper appears in: **Frontiers of Massively Parallel Computation, 1988. Proceedings., 2nd S***  
**the Frontiers of**

On page(s): 327 - 329  
10-12 Oct. 1988  
1989  
ISBN: 0-8186-5892-4  
Number of Pages: xxxxi+736  
References Cited: 3  
INSPEC Accession Number: 3532276

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**Abstract:**

The author describes the implementation of a scan line graphics generation algorithm on the massivel processor MPP. Pixels are computed in parallel and their results are applied to the Z buffer in large gr perform pixel value calculations, facilitate load balancing across the processors and apply the results t efficiently in parallel requires special virtue routing (sort computation) techniques developed by the a especially for use on single-instruction multiple-data (SIMD) architectures. This involves a preproces step which determines how much of the sort is necessary to provide sufficient contiguous space to dup data. Once this has been determined a sort is used to compress the data which can be terminated early information derived by the scout step. This then gives the ability to keep as many processors as possib reasonable efficiency.

---

**Index Terms:**

pixel brightness; massively parallel processor; scan line graphics generation algorithm; Z buffer; pixe calculations; load balancing; virtue routing; sort computation; single-instruction multiple-data; SIMD graphics; parallel algorithms; parallel architectures

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File: JPAB

Aug 7, 1985

DOCUMENT-IDENTIFIER: JP 60150139 A  
TITLE: DATA FLOW PROCESSOR

## FPAR:

PURPOSE: To attain the parallel processing for transfer of data and to increase the processing speed of a data flow processor, by using a detecting function for data transfer to plural bus groups as well as a simultaneous access function for memory addresses of instructions.

## FPAR:

CONSTITUTION: The instructions stored in a memory part M are sent to the 1st bus groups Bus1-1&sim;Bus3-1 via an interface part Di together with data and then undergo the arithmetic processing through corresponding arithmetic parts f1&sim;f3 via an interface R. The results of the arithmetic processing are delivered after the idle state is decided at an arithmetic output interface part D for the 2nd bus groups Bus1-2&sim;Bus3-2. Then an interface part A of the part M decodes the address information to which the next execution instruction is designated for the data on the 2nd bus groups when these groups are filled. Then an access is given to an instruction corresponding to the decoded information from the part M. This instruction is sent to the 1st bus together with the next arithmetic object data through the part Di. Then the transfer of data is processed in parallel. This can accelerate the processing speed of a data flow processor.

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L4: Entry 1 of 1

File: TDBD

Mar 1, 1980

DOCUMENT-IDENTIFIER: NN80034369

TITLE: Storage Protection Mechanism for Processor. March 1980.

**TBTX:**

3p. This article describes a mechanism for checking for possible software errors that could disrupt the integrity of the main storage in a processor, thus providing some degree of storage protection. The Storage Protection Device utilizes circuitry shown in Fig. 1 and is adaptable to a system without affecting the hardware or data flow of a processor having a Storage Relocation Translator such as that described in U.S. Patents 4,037,215 and 4,050,094. It serves to control processor channel functions without being part of the channel. - Storage access is controlled through bits contained in the storage relocation translator segmentation registers. The segmentation register bit format is shown in Fig. 2. - Bit S (Summary)- This bit if set to "1" indicates that the programmer has set his address to point to a location greater than the maximum storage defined for that processor. Therefore, the hardware will prevent this storage access and flag the address as an Invalid Storage Address (ISA). - Bits A, 0, 1, 2, 3, 4 -These are the high-order physical address bits of a 17 bit address. - Bit V (Valid) - This bit must be set to a "1". If set to zero the address associated with that segmentation register is considered invalid. If an attempt is made to use this address, the hardware will prevent this storage access and flag the address as an ISA. - Bit R (Read Only) -- If set to a "1", it serves to block storage writes to the location in storage specified by that segmentation register. An attempt to write to this location with the read-only bit "on" will result in a Protect Check in the processor status word (PSW) and an end to the storage access. - A storage cycle is initiated by a Set Storage Address Register instruction. This is followed by a signal from the channel to storage, called Storage Gate A, which indicates that a storage address is on the Storage Address Bus. This is followed by another signal from the channel to storage called Storage Gate E, which gates data to the Data Bus. When Storage Gate A and Storage Gate E are received by storage, a signal from storage to the channel is generated called Synchronous Storage Return, meaning that storage is capable of operating at synchronous speed. Should this cycle not be completed within a predetermined time interval such as 6.4 microseconds, the channel will time out and the processor will generate an ISA check condition. - The circuitry of Fig. 1 checks for the invalid conditions aforementioned and determines whether Storage Gate B will be blocked or not. If Storage Gate B is blocked, the storage access cycle will not be complete. Synchronous Storage Return would never be generated, and the channel would time out. - The logic circuitry in Fig. 1 is active only when the storage relocation translator is enabled, as evidenced by active control lines 1 and 2. The upper group of circuits 3-5 provide the checking operation when the storage transfer is either between the processor and main storage or between the channel and main storage when operating in a direct program control (DPC) mode. Control line 6 disables the Storage Gate B line to gate 7 when segmentation register bit V indicates a not-valid condition. Control line 8 will disable the gate 7 when bit S indicates a programming error when initially loading the segmentation registers. The output of AND circuit 5 will disable the gate 7 when the processor is doing a write to main storage and bit R indicates a read-only status. - The lower group of circuits 10-13 perform a similar checking operation for segmentation register bits S and V when cycle steal data transfers are being performed between the channel and the main storage unit. Gate 7 is disabled if bit S has a value of 1 (programming error) or bit V has a value of 0 (not valid). Circuits 12 and 13 provide a latch circuit, line 14 being the set Input and line 15 being the reset input.

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L1: Entry 2 of 2

File: USPT

Aug 24, 1999

US-PAT-NO: 5943242

DOCUMENT-IDENTIFIER: US 5943242 A

TITLE: Dynamically reconfigurable data processing system

DATE-ISSUED: August 24, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Vorbach; Martin Andreas	Karlsruhe	N/A	N/A	DEX
Munch; Robert Markus	Karlsruhe	N/A	N/A	DEX

## ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
PACT GmbH	Karlsruher	N/A	N/A	DEX	03

APPL-NO: 8/ 544435

DATE FILED: November 17, 1995

INT-CL: [6] G06F 13/00, G06F 17/00

US-CL-ISSUED: 364/491; 395/800.11, 395/800.14, 395/800.18

US-CL-CURRENT: 716/17; 712/11, 712/14, 712/18

FIELD-OF-SEARCH: 364/488-491, 364/749, 364/745, 364/716.02, 364/716.03, 364/716.01, 364/716.05, 395/800, 395/707, 395/800.16, 395/800.14, 395/800.15, 395/800.18, 395/800.11

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY
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0428327A1	November 1990	EPX
0539595A1	April 1992	EPX
0 678 985	October 1995	EPX
0 726 532	August 1996	EPX
WO90/11648	October 1990	WOX
94/08399	April 1994	WOX

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M. Morris Mano "Digital Design," by Prentic-Hall, Inc., Englewood Cliffs, New Jersey 07632, 1984, pp. 119-125, 154-161.

ART-UNIT: 273

PRIMARY-EXAMINER: Teska; Kevin J.

ASSISTANT-EXAMINER: Siek; Vuthe

ATTY-AGENT-FIRM: Kenyon & Kenyon

ABSTRACT:

A data processing system, wherein a data flow processor (DFP) integrated circuit chip is provided which comprises a plurality of orthogonally arranged homogeneously structured cells, each cell having a plurality of logically same and structurally identically arranged modules. The cells are combined and facultatively grouped using lines and columns and connected to the input/output ports of the DFP. A compiler programs and configures the cells, each by itself and facultatively grouped, such that random logic functions and/or linkages among the cells can be realized. The manipulation of the DFP configuration is performed during DFP operation such that modification of function parts (MACROs) of the DFP can take place without requiring other function parts to be deactivated or being impaired.

23 Claims, 30 Drawing figures

**WEST****End of Result Set**

Generate Collection

L1: Entry 2 of 2

File: USPT

Aug 24, 1999

US-PAT-NO: 5943242

DOCUMENT-IDENTIFIER: US 5943242 A

TITLE: Dynamically reconfigurable data processing system

DATE-ISSUED: August 24, 1999

INT-CL: [6] G06F 13/00, G06F 17/00

US-CL-ISSUED: 364/491, 395/800.11, 395/800.14, 395/800.18

US-CL-CURRENT: 716/17, 712/11, 712/14, 712/18FIELD-OF-SEARCH: 364/488-491, 364/749, 364/745, 364/716.02, 364/716.03,  
364/716.01, 364/716.05, 395/800, 395/707, 395/800.16, 395/800.14, 395/800.15,  
395/800.18, 395/800.11

**WEST**

Generate Collection

L1: Entry 1 of 2

File: USPT

Sep 12, 2000

US-PAT-NO: 6119181

DOCUMENT-IDENTIFIER: US 6119181 A

TITLE: I/O and memory bus system for DFPs and units with two- or multi-dimensional programmable cell architectures

DATE-ISSUED: September 12, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Vorbach; Martin	Karlsruhe	N/A	N/A	DEX
Munch; Robert	Karlsruhe	N/A	N/A	DEX

## ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
PACT GmbH	Munich	N/A	N/A	DEX	03

APPL-NO: 8/ 947254

DATE FILED: October 8, 1997

## FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
DE	196 54 595	December 20, 1996

INT-CL: [7] G06F 13/40, G06F 15/80

US-CL-ISSUED: 710/100; 710/110, 710/129, 712/11

US-CL-CURRENT: 710/100; 710/110, 710/129, 712/11

FIELD-OF-SEARCH: 395/280, 395/309, 395/800.11, 395/80.25, 395/800.29, 395/377, 326/38, 326/39, 326/41, 364/489, 370/419, 710/100, 710/129, 710/110, 712/11, 712/14, 712/18, 712/25, 712/29, 712/31, 711/100

## REF-CITED:

## U.S. PATENT DOCUMENTS

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<input type="checkbox"/>	<u>5659797</u>	August 1997	Zandveld et al.	710/22
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0 678 985	October 1995	EPX
0 726 532	August 1996	EPX
735 685	October 1996	EPX
4416881	November 1994	DEX
WO90/11648	October 1990	WOX
94/08399	April 1994	WOX

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Villasenor, John, et al., "Configurable Computing." Scientific American, vol. 276, No. 6, Jun. 1997, pp. 66-71.

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Maxfield C. "Logic that Mutates While-U-Wait" EDN (Bur. Ed) (USA), EDN (European Edition), Nov. 7, 1996, Cahners Publishing, USA.

ART-UNIT: 271

PRIMARY-EXAMINER: Ray; Gopal C.

ATTY-AGENT-FIRM: Kenyon & Kenyon

## ABSTRACT:

A uniform bus system is provided which operates without any special consideration by a programmer. Memories and peripheral may be connected to this bus system without any special measures. Likewise, units may be cascaded with the help of the bus system. The bus system combines a number of internal lines, and leads them as a bundle to terminals. The bus system control is predefined and does not require any influence by the programmer. Any number of memories, peripherals or other units can be connected to the bus system.

35 Claims, 20 Drawing figures

**WEST**

Generate Collection

L1: Entry 1 of 2

File: USPT

Sep 12, 2000

US-PAT-NO: 6119181

DOCUMENT-IDENTIFIER: US 6119181 A

TITLE: I/O and memory bus system for DFPs and units with two- or multi-dimensional programmable cell architectures

DATE-ISSUED: September 12, 2000

INT-CL: [7] G06F 13/40, G06F 15/80

US-CL-ISSUED: 710/100; 710/110, 710/129, 712/11

US-CL-CURRENT: 710/100; 710/110, 710/129, 712/11FIELD-OF-SEARCH: 395/280, 395/309, 395/800.11, 395/80.25, 395/800.29, 395/377, 326/38, 326/39, 326/41, 364/489, 370/419, 710/100, 710/129, 710/110, 712/11, 712/14, 712/18, 712/25, 712/29, 712/31, 711/100